Zlinx 485

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Chapter 1: Introduction

Thank you for purchasing a Zlinx 485 product! This product has been manufactured to the highest standards of quality and performance to ensure your complete satisfaction.

About this Manual

This manual has been created to assist you in installing, configuring and using your Zlinx 485 Base module. Please read it carefully and follow the instructions to achieve best results.

Support

For additional information on this and other B&B products, and for technical support, call 815.433.5100 option 3, or access the B&B Electronics website at www.bb-elec.com.

Zlinx Product Family

Zlinx 485 Base modules provide easy-to-use, cost-effective peer-to-peer or Modbus solutions.

Figure 1. A Zlinx ZZ-NX485 Module

The Zlinx 485 family of products features a selection of operational modes, communications modes, Modbus and I/O combinations. The system is scalable making it easy to start with a few I/O points and build a system with the required I/O-Modbus mix.

Features

- Choice of number and type of digital and analog I/O
- Supports RS-232 and RS-422/485 lines
- Sourcing or sinking digital outputs available
- Configurable NPN (Sinking) and PNP (Sourcing) digital inputs
- Flexible and scalable by adding expansion modules
- MODBUS and Peer-to-Peer communications modes
- Small, economical and configurable
- Tolerates a wide operating temperature range
- Choice of a range of DC power sources
- Power, Data and Bus LED's
- Removable screw terminal blocks for power supply and I/O-Modbus connections
- Zlinx 485 Manager configuration software
- DIN rail mountable

Package Checklist

Zlinx 485 Base modules are shipped with the following items included:

✓ Zlinx 485 Base module
✓ A printed version of the Zlinx 485 Quick Start guide
✓ CD-ROM disc with
-Zlinx 485 Manager configuration software
-Zlinx 485 Firmware Updater
-This manual in PDF format
-A quick start guide in PDF format
✓ 6 foot RJ45 male to serial (DB9 female) adapter cable

Expansion modules are shipped with the following items included:

✓ Zlinx 485 Expansion module
✓ A printed version of the Zlinx 485 Quick Start guide

Chapter 2: Hardware

Zlinx 485 encompasses a growing family of products including Modbus, Peer-to-Peer, base modules, expansion modules, configuration software and accessories. All modules are built into similar enclosures featuring male local bus plugs and female local bus receptacles on the sides, which allow modules to connect together. Modules are DIN rail mountable and feature removable screw terminal blocks.

Zlinx 485 Modules

Zlinx 485 systems consist of base modules and expansion modules. Expansion modules are configured using a base module, which also has programming capabilities. The base module is connected to a PC that is running the Zlinx 485 Manager software. Zlinx 485 systems can operate in Modbus or Peer-to-Peer modes. In Modbus mode a Zlinx 485 system exchanges Modbus messages with a Modbus capable base module. In Peer-to-peer mode two Zlinx 485 systems are linked in a slave-master connection to provide dependable, direct serial communications.

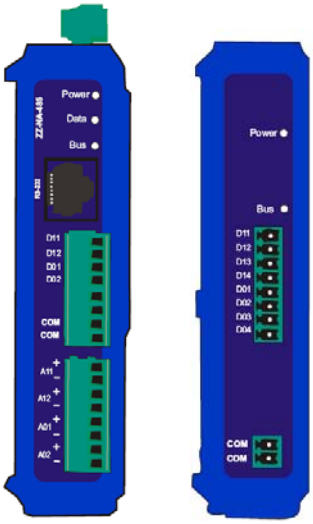


Figure 2. Front View of Zlinx 485 Base and Expansion Modules

Base Modules

Each Zlinx 485 system is built around a **base module**. Base modules provide Modbus, digital and/or analog I/O and communicate with other Zlinx nodes.

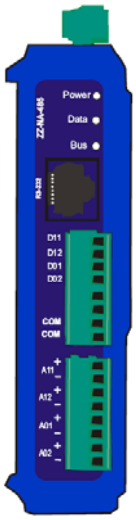


Figure 3. A Typical Base Module

Several different combinations of digital inputs (DI), digital outputs (DO), analog inputs (AI) and analog outputs (AO) are available. For example, the ZZ-NA-485 Base module features a combination of two AI's, two AO's, two DI's and two DO's in a package.

Expansion Modules

Up to six **expansion modules** can be plugged into the base module to add more I/O capabilities in any combination needed. For example, the ZZ-8DO-T Expansion module provides eight additional digital outputs; the ZZ-2AI2AO provides two analog inputs and two analog outputs.

Refer to Appendix E for a list of Zlinx 485 models and features.

Expansion modules connect to base modules by plugging the modules together, engaging the local bus connectors located on the sides of the boxes. Male plugs on expansion modules plug into female connectors on the side of the base module or other expansion modules, resulting in a horizontal "stack" with the base module on the left and expansion modules extending to the right.

Figure 4. Base and Expansion Modules Connected Together

Programming the Base Module using the RS232 connector

The base module has a programming feature that can be used to configure that base module as well as expansion modules. The base module connects to the PC for configuration. Connect a PC through the serial port (COM1 to 16) using the provided RJ45 male to serial (DB9 female) cable.

Note: A standard RJ45 to serial (DB9) cable will not work, use only the one supplied

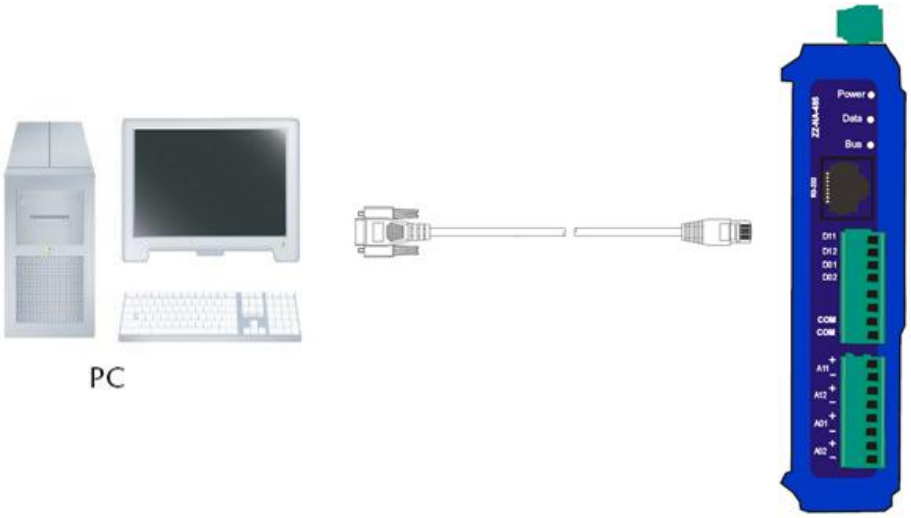


Figure 5. Connecting a PC and Base

Indicators, Connectors and Accessories

LED Indicators

Zlinx 485 Base modules have three LED indicators: a Power LED, a Data LED and a Local Bus Data LED.

Expansion modules have two LED's: a Power LED and a Local Bus Data LED

Power LED

The **Power** LED illuminates (red) immediately on power up indicating that DC power is present on the power supply terminals.

Data LED

The **Data** LED blinks (green) when data is being transmitted or received, either to an expansion module or another base module. When the LED is off no data is being transmitted or received.

Bus LED

The **Bus** LED blinks (green) when data is being transmitted or received on the local bus connection. When the LED is off no data is being transmitted or received.

Note: I*f communications is not established within a preset number of retries (default is 10) the Data and Bus LED's blink alternately to indicate a loss of communications.*

Connectors

Zlinx 485 Base and Expansion modules feature connectors for connecting field I/O wiring and plugging together Zlinx 485 modules (local bus). In addition, Zlinx 485 Base modules include connectors for connecting a power supply and an RJ45 connecter to connect to the PC using the supplied RJ45 to serial cable.

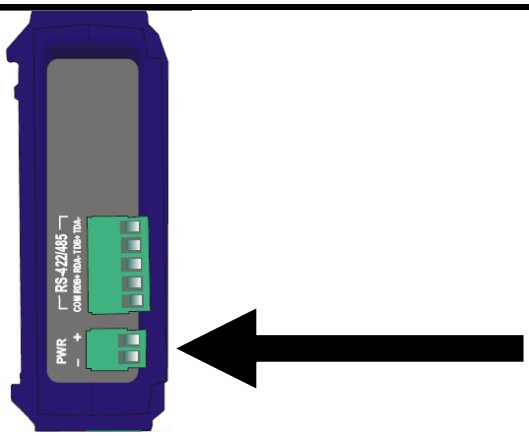


Figure 6. Power Supply Connector

The **Power Supply** connector (base modules only) is a two-position removable terminal block located on the top of the unit. Terminal spacing is 3.5 mm. The terminal block accepts solid and stranded wires from 28 AWG to 16 AWG. **Please check polarity marking in Figure 8.**

Refer to the following section for information on Power Supply Requirements.

Expansion modules receive power from the base module via the local bus connector.

Local Bus Connectors

Local Bus connectors are included on all base and expansion modules. These connectors are dual row, 14 pin (2 mm spacing) connectors. Base modules have only a female connector. Expansion modules have male connectors on one side and female connectors on the other. Modules are plugged together to supply power and facilitate communication between modules.

When adding an Expansion module to a Base module the male connector on the expansion module plugs into the female connector on the base module. The second expansion module plugs into the first, and so on, up to a maximum of six expansion modules.

Figure 7. Local Bus Connector Location

RS-422/485 and I/O connectors for base and expansion modules are removable (plug in) screw terminal blocks located on the front and top of the unit. Terminal spacing is 3.5 mm. Depending on the specific model, the number of terminals may vary. The maximum is 16 terminals (two 8-terminal blocks) for I/O, with an additional 5 terminals for RS-422/485 on the base module.

The **Serial Port Connector** on the Zlinx 485 is an RJ45 female connector (configured as a DCE) device supporting RS-232 serial communications including TD (Pin 3 on the DB9 end), RD (Pin 2) and GND (Pin 5) signal lines. If the Modbus device you are connecting to the Zlinx Base Module is configured as a DTE device you will use a straight-through serial cable. If the Modbus device is configured as a DCE device, use a null modem cable or adapter.

Refer to Appendix C for connection pin-outs.

RS-422/485 Connector

The **RS-422/485 connector** on the Zlinx Base module is a five position removable terminal block with screw downs. The connector provides screw connections for:

- Terminal 1 – **TDA(-)**
- Terminal 2 – T**DB(+)**
- Terminal 3 – **RDA(-)**
- Terminal 4 – **RDB(+)**
- Terminal 5 – **GND**

Figure 8. Zlinx 485 Base Module RS-422/485 Connector

RS-422/485 Four-Wire Mode

When the Zlinx Base module is configured to operate in RS-422/485 four-wire mode the receive terminals are connected to the transmit terminals of the Modbus device it is communicating with. Its transmit terminals are connected to the receive terminals of the Modbus device it is communicating with.

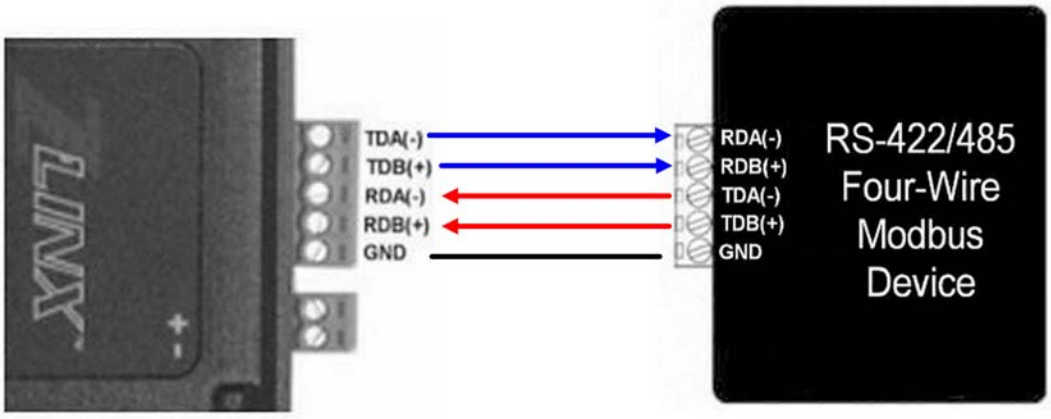


Figure 9. RS-422/485 Four-Wire Connection

RS-422/485 Two-Wire Mode

When the Zlinx Base module is configured to operate in RS-485 two-wire mode (RS-422/485 switch in the right position) the two-wire RS-485 two-wire communications cable pair is connected to Terminals TDB and TDA. The communications cable ground/shield is connected to GND.

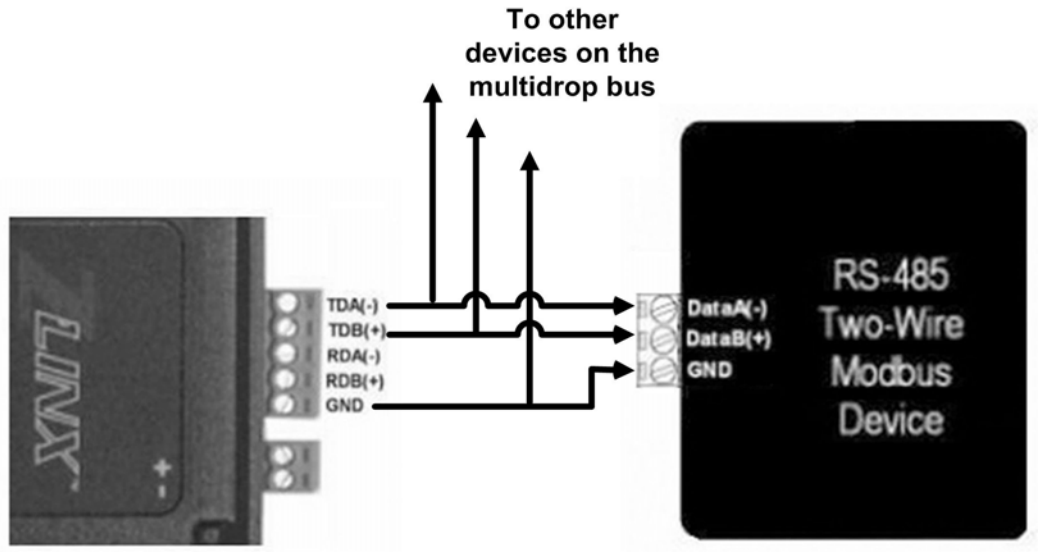


Figure 10. RS-485 Two-Wire Connection

No jumpers are required to bridge the transmit and receive lines in two-wire mode.

RS-232 Connection

Connect to RS-232 using the RJ45 jack on the front Base module, using the supplied RJ45 male to serial (DB9 female) cable. Note: RTS is reserved for use by the configuration software only. Asserting RTS during normal operation will result in a communication failure. Disable RTS if your hardware supports it.

Note: A standard RJ45 to serial (DB9) cable will not work, use only the one supplied

Power Supply Requirements

Zlinx 485 systems can be powered from 10 to 30 VDC power sources. No supply is included since the power rating of the supply will depend on the total power requirements of all modules used in the system.

Appendix A contains a listing of power requirements for all Zlinx 485 modules.

Mounting Hardware

Zlinx 485 modules can be DIN rail mounted. The DIN mounting clip and spring is included on each module.

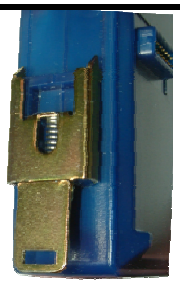


Figure 11. DIN Clip with Spring on a Zlinx 485 Module

I/O Options and Characteristics

I/O Options

The Zlinx 485 family of products features a variety of input and output options. Base and expansion module options include:

- 2 analog inputs, 2 analog outputs, 2 digital inputs and 2 digital outputs (sourcing or sinking driver)
- 4 digital inputs and 4 digital outputs (sourcing or sinking driver)
- 8 digital inputs
- 8 digital outputs (sourcing or sinking driver)
    - 8 relay output model available
- 4 analog inputs
    - RTD Temperature input module available
- 4 analog outputs
- 2 analog inputs and 2 analog outputs

(Modules continue to be developed with additional features and options.)

Refer to Appendix E for a list of available models and options.

I/O Types and Characteristics

Digital Inputs

DI's can detect the presence of contact closures, transistor switches or on/off DC voltage signals (low or high logic levels). Voltages below 0.8 VDC are interpreted as a low state. Voltages between 4.0 VDC and 48 VDC are interpreted as a high state.

DI's are also programmable to be NPN or PNP

Digital Outputs

Digital outputs send on/off signals (low or high logic levels) to drive external devices such as indicators, relay coils or the inputs of other equipment such as PLC's, SCADA, etc. Modules with digital outputs are available with sourcing or sinking drivers.

Sourcing (PNP transistor) drivers provide up to 240 mA per output at output voltages up to 30 VDC to connected loads.

Sinking (NPN transistor) drivers can sink up to 40 mA per output at voltages up to 48 VDC.

Analog Inputs

Analog inputs accept voltage, current signals, or RTD temperature signals. When configured as voltage inputs the full range is 0 to 10 VDC. When configured as current inputs the full range is 0 to 20 mA and the input resistance is 240 ohms. When configured as RTD input the allowable sensor types are PT100, PT1000 for CU10.

Analog Outputs

Analog outputs produce voltage or current output signals. When configured as voltage outputs the full range is 0 to 10 VDC at 1 mA maximum. When configured as current outputs the full range is 0 to 20 mA with a maximum load resistance of 375 Ω at 20 mA and 10 VDC supply voltage.

0 to 20 mA AI's and AO's accommodate standard 4 to 20 mA instrumentation current loop signals.

I/O Wiring

DI Wiring

DI is programmable to be either NPN or PNP. The following diagram shows typical connection wiring for various digital inputs:

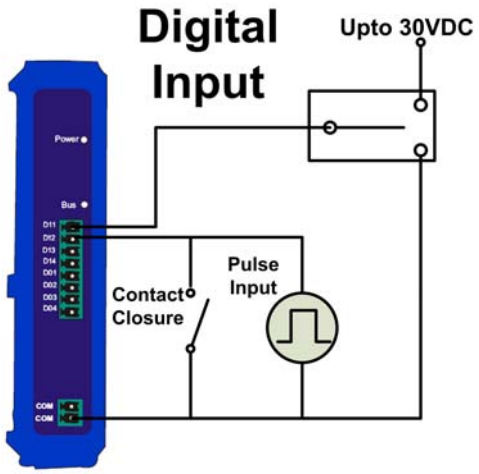


Figure 12. Typical Digital Input Wiring for Various Input Devices (ZZ-4DID0-DCT Expansion Module)

Note: No external power supply wiring is required for Expansion modules

DO Wiring

The following diagram shows typical connection wiring for modules featuring **sourcing (PNP) drivers**:

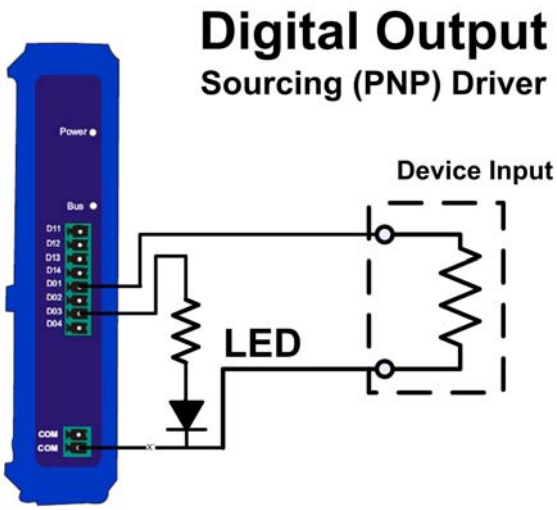


Figure 13. Typical Digital Output Wiring for Sourcing Outputs (ZZ-4DID0-DCT Expansion Module)

The following diagram shows typical connection wiring for modules featuring **sinking (NPN) drivers**:

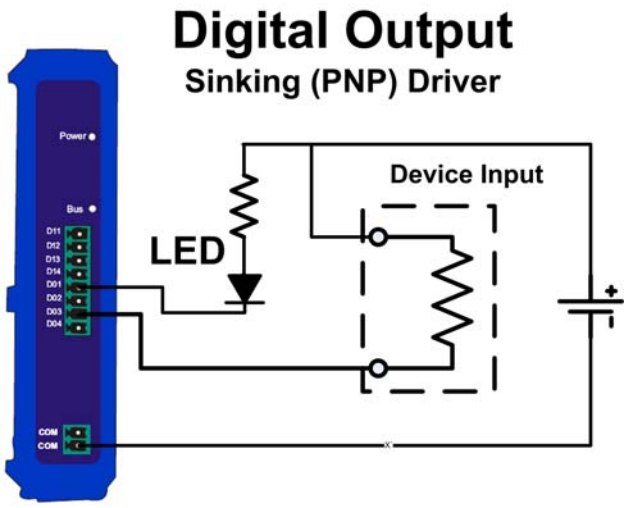


Figure 14. Typical Digital Output Wiring for Sinking Outputs (ZZ-4DID0-DCT1 Expansion Module)

AI Wiring

The following diagram shows typical connection wiring for analog inputs:

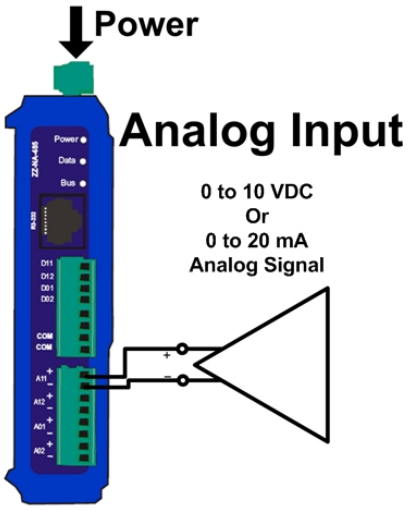


Figure 15. Typical Analog Input Wiring (ZZ9D-NA-MR Base Module)

AO Wiring

The following diagram shows typical connection wiring for analog outputs:

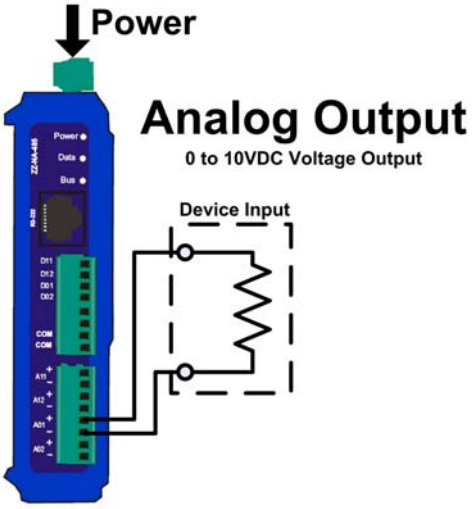


Figure 16. Typical Analog Output Wiring (ZZ9D-NA-MR Base Module)

RTD Wiring

The following diagram shows typical connection wiring for RTD inputs.

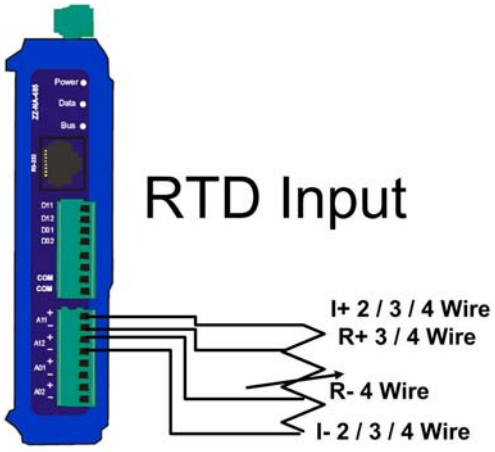


Figure 17. Typical RTD Input Wiring

Figure 18.

Relay Wiring

The following diagram shows typical connection wiring for Relay outputs.

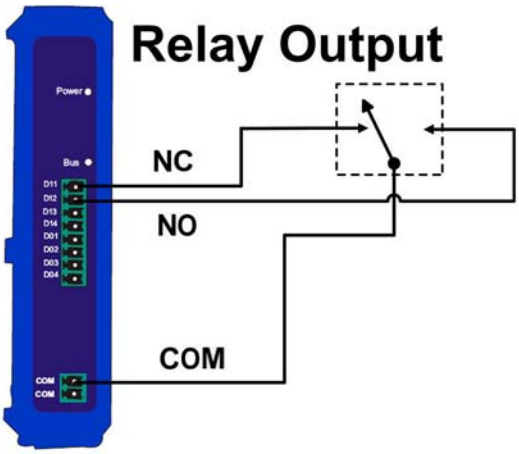


Figure 19. Typical Relay Output Wiring

Modbus Mode Configuration

The Zlinx 485 Base module can be configured to operate in Modbus Mode. In Modbus mode messages are sent across the physical layer (wiring configuration) from the Zlinx 485 base to the Modbus network.

To use Modbus mode successfully, an understanding of the Zlinx 485 memory map assignments is necessary.

Modbus function codes supported:

Function 1: Read DO Status
Function 2: Read DI's
Function 3: Read AO Status
Function 4: Read AI's
Function 5: Write Single DO's
Function 6: Write to Single AO
Function 15: Write to Multiple DO's

Messages sent between Zlinx 485 and a Modbus node use Modbus memory addresses to specify what type of information is being sent and where it is stored. In the Modbus addressing scheme each type of I/O (DO, DI, AI and AO) is stored in a different section of the memory.

I/O Type	Modbus Memory Address
DO	00001 to 00112
DI	10001 to 10112
AI	30001 to 30112
AO	40001 to 40112

Figure 20. I/O Memory Areas Table

Within these sections, addresses are reserved for all Zlinx 485 modules that may be used.

Module	Memory Range
Base	x0001 to x0016
Expansion 1	x0017 to x0032
Expansion 2	x0033 to x0048
Expansion 3	x0049 to x0064
Expansion 4	x0065 to x0080
Expansion 5	x0081 to x0096
Expansion 6	x0097 to x0112

Figure 21. Module I/O Addressing Table

The following examples show how the addressing works:

Example 1: To turn on the second digital output (DO2) on the Base Module, the Modbus Base Module sends a message placing a logic 1 in memory location 00002.

Example 2: To cause expansion module 3 to output a specified voltage on AO1, the Modbus Base Module sends a message to set the register at Modbus address 40049 to the appropriate value.

A list of all Modbus address assignments for all Zlinx 485 points is shown in Appendix D. Several important points about this list should be noted:

- Some addresses are listed but not implemented in current versions of Zlinx 485 hardware.
- Some addresses are reserved for internal Zlinx 485 use.
- Some addresses are reserved for future use.
- 40000 series addresses store Analog Output data AND Frequency Counter data when Digital Inputs are configured for Frequency Counter operation. For each module, the first eight memory locations are assigned to AO data and the next four locations are assigned to Frequency Counter data.
- If a Modbus device communicating with Zlinx 485 tries to send to or receive from a memory address not implemented by the hardware in use, the Zlinx 485 replies with an exception response.
- Users cannot span across two memory maps, i.e. from 34 to 50.

- A maximum of 16 points can be displayed at any one time.

Appendix D of this manual contains a list of Modbus I/O assignments for the Zlinx 485.

Zlinx 485 Modes of Operation

Zlinx 485 systems can operate in Peer-to-Peer or Modbus modes.

Peer-to-Peer Mode

In Peer-to-Peer mode two Zlinx 485 systems provide full serial I/O functionality. In this mode one Base is configured as the master and the other as the slave. (It does not matter which end of the link is the master and which is the slave.) Both Base Modules must be the same model. Analog and digital input signals connected to AI's and DI's on one module appear on the corresponding AO's and DO's on the other module. Any Expansion modules included in a Peer-to-Peer system must be chosen to be complimentary. For example, if expansion module 1 on one end of the link is a ZZ-4AI (4 analog inputs), expansion module 1 on the other end of the link must be a ZZ-4AO (4 analog outputs.

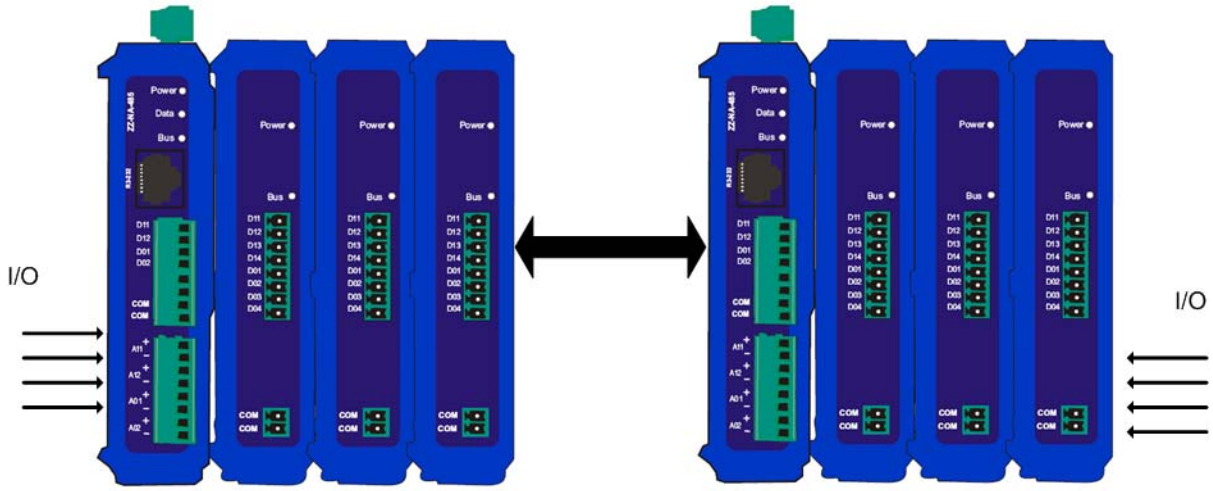


Figure 22. Peer to Peer Mode

Modbus Mode

In Modbus mode standard Modbus messages can be sent and received between a Modbus Base Module and a Zlinx 485 system. Data written to output addresses in the Zlinx 485 results in signals appearing on its outputs. Signals connected to Zlinx 485 inputs are converted and stored in Modbus input memory locations and then sent across the link as Modbus messages to the Modbus Base Module.

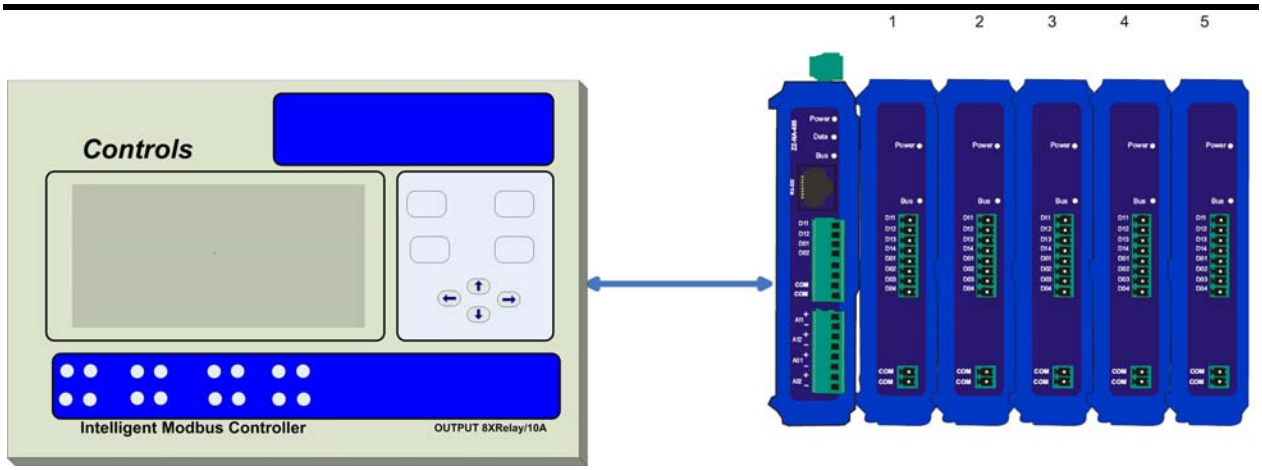


*Figure 23. Modbus Mode devices may be PLCs, RTUs, DCSs, or other **Modbus** devices, with links up to 32 nodes per Modbus network*

Connecting the Hardware

With an RS-232 connection, the **Zlinx 485 Base module** is connected to a Modbus device via a DB-9M connector and an RS-232 cable. If the connected Modbus device is configured as a DTE device, use a straight-through cable. If the connected Modbus device is configured as a DCE device, use a null modem cable.

Always check the interface specifications of the Modbus device to determine whether it is a DTE or DCE before connecting.

RS-232 may be connected to a PC using an RS-485 Converter, to allow using Modscan 32 to poll the registers.

For RS-422/485 wiring, the **Zlinx 485 Base** module is connected to the Modbus device via the RS-422/485 terminal block. In RS-422/485 four-wire mode a cable containing two pairs and a ground/shield is used. In RS-485 two-wire mode a cable containing one pair and a ground/shield is used.

Power is supplied to the converter via the power supply terminal block.

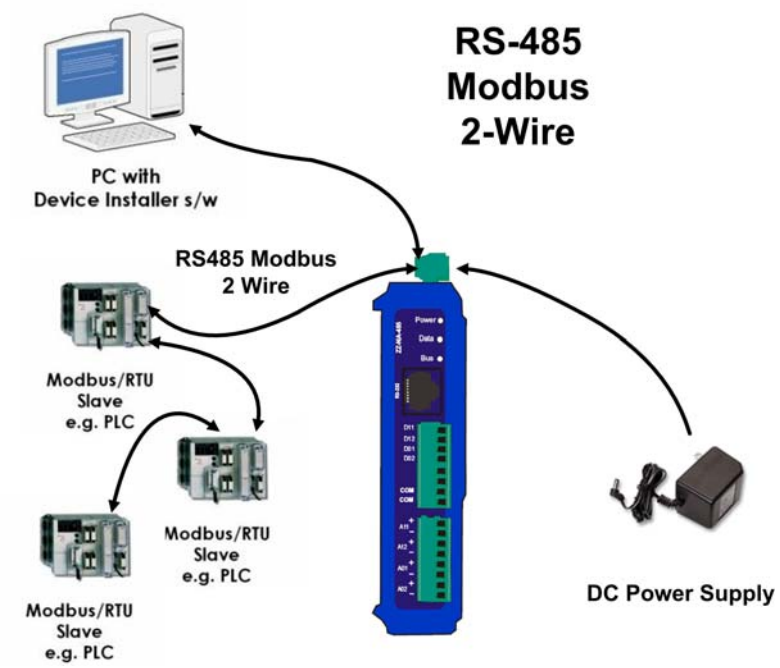


Figure 24. Zlinx Base Module 2 wire RS-485 Connections

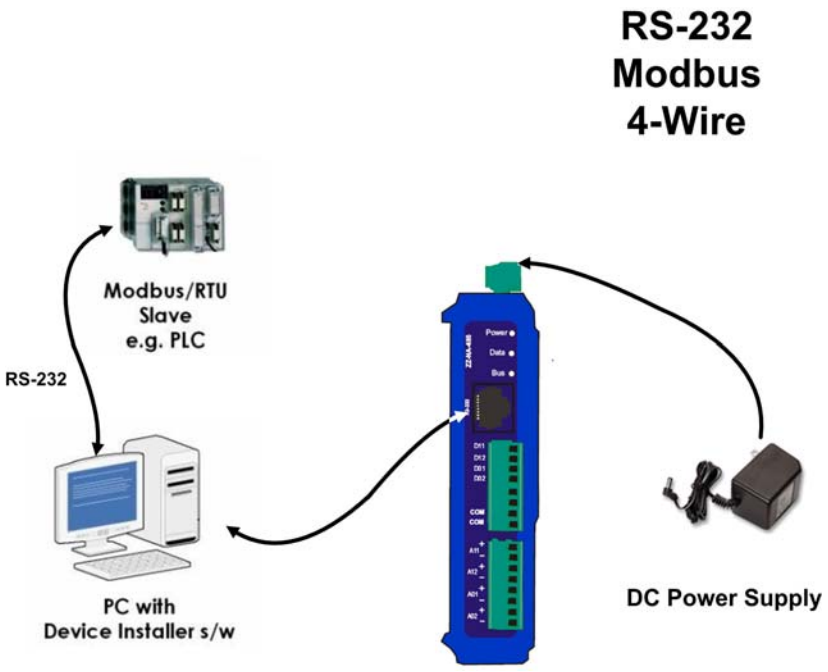


Figure 25. Zlinx Base Module 4 wire RS-232 Connections

Chapter 3: Getting Started

Zlinx 485 Installation

Zlinx 485 Mounting

Zlinx 485 modules are DIN rail mountable. Additional ZZ-DIN1 mounting kits can be purchased for replacement. Each kit includes a DIN clip and spring and four spare screws for the Zlinx 485 enclosure.

Computer System Requirements

The Zlinx 485 Manager software requires the following computer hardware and operating systems:

- A PC with one serial port available between COM1 and COM16
- Windows XP (Home or Professional with SP1 and SP2), Windows 2000 (with SP4), Windows 98 (SP1, Second Edition) or Windows ME

Installing Zlinx 485 Software

To install the **Zlinx 485 Manager** software:

1. Insert the CD included with your Zlinx 485 product into the CD ROM drive of your PC.

2. The installation should launch automatically. If not:

   a. Click **Start** on the Task Bar and select **Run**

   b. Type in [CD drive letter]:\setup.exe

3. Follow the prompts to install the software.

   When installation is complete Zlinx 485 Manager, Zlinx 485 Firmware Updater, and .PDF files containing this manual and the Quick Start guide are accessible from the Windows Start menu.

Connecting Zlinx 485 to a PC

1. With power disconnected, connect the Base Module into the PC. [Shall change this diagram]

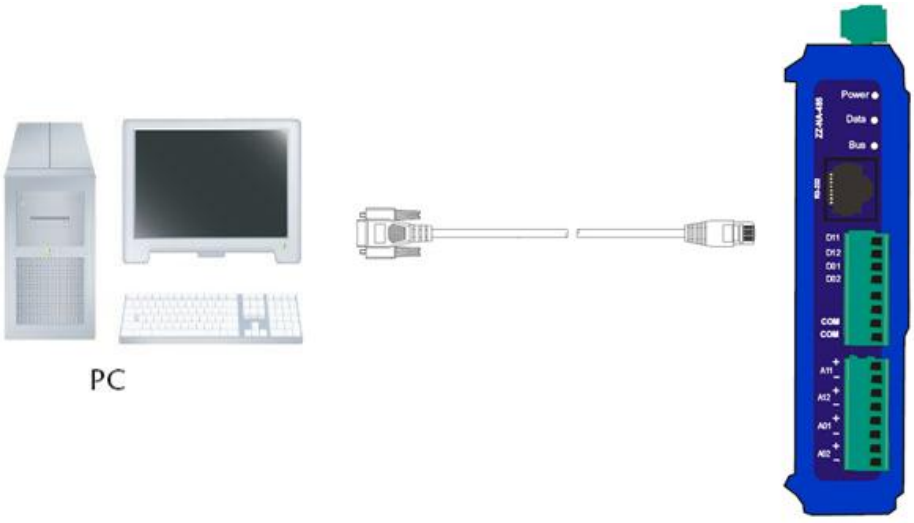


Figure 26. Connecting a PC and Base Module

2. Connect any required expansion modules to the base module. (The male local bus connector on the first expansion module plugs into the female connector on the base module. The second expansion module plugs into the first, etc.)

3. Connect the PC serial port to the Base Module using the supplied RJ45 male to serial (DB9 female) 6 ft cable.

4. Re-apply power to the Zlinx 485 Base Module. The Power LED should light up.

Starting Zlinx 485 Manager

1. From the Windows Start menu, start the Zlinx 485 Manager software.

   The Zlinx 485 splash window appears briefly, followed by the discovery window.

2. The Connection drop down list defaults to **Automatic** discovery. The software scans through COM ports looking for Zlinx 485 devices. The scan starts with the most recently used serial port in which a device was found.

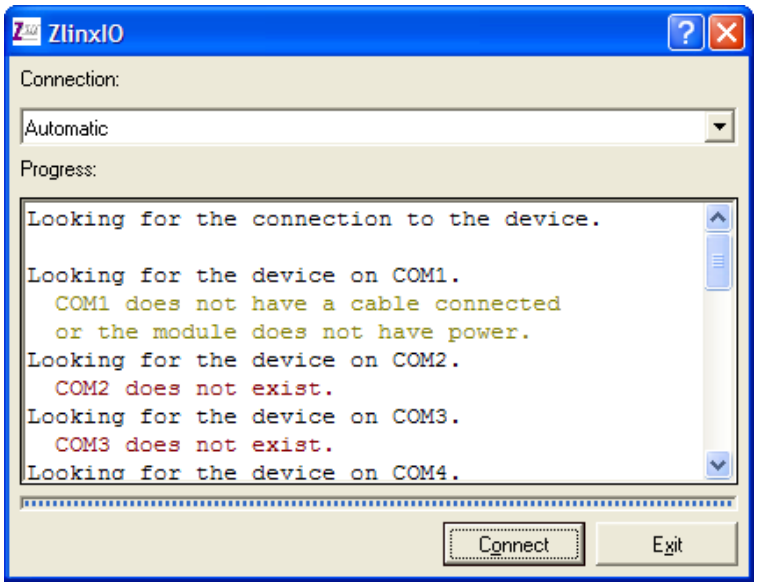


Figure 27. Discovery Window

During the scan the Progress box displays information about the scanning process. If a device is not found at the most recently successful port it continues to scan through COM ports 1 to 16. The bar graph near the bottom of the window indicates progress.

3. If the device is not found the Progress box displays:

```
The device was not found on any serial port.
```

   a. Check the power supply and serial cable connections

   b. Click the Connect button. The connection process will be repeated and the device should be found.

4. If Automatic connection is not desired, a particular COM port (1 to 16) can be specified:

   a. Select the COM port number from the Connection drop down list.

   b. Click the Connect button to initiate the connection process.

Clicking the Stop button stops the module discovery process.

5. If the device is found, the Zlinx 485 Manager window opens.

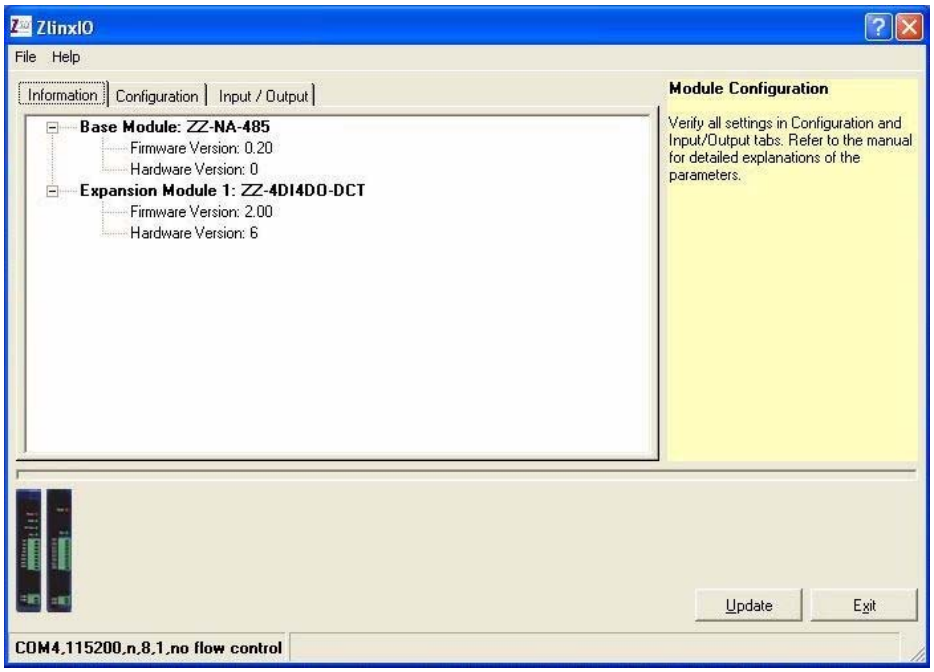


Figure 28. Zlinx 485 Manager

The Zlinx 485 Manager window contains:

- File and Help menus
- Three tabbed panes: Information, Configuration, and Input/Output
- A Help sidebar containing information and hints related to the current tab
- A graphic display of the base and expansion Modules discovered
- A Status bar (at the bottom) showing the COM port and communications parameters (baud rate, parity, data bits, stop bits and flow control)
- An Update button used to save configuration parameters to the modules.
- An Exit button.

Information Tab

The Information tab displays a tree structure listing:

- Base and expansion modules detected and their model numbers
- Firmware version number for each module

- Hardware version number for each module

Configuration Tab

The Configuration tab contains fields that allow configuration of:

- Communications Modes: Peer-to-Peer Master, Peer-to-Peer Slave, Modbus (and related parameters)

Input/Output Tab

The Input/Output tab contains:

- A tree structure listing input and output types for each module
- Input and output configuration options

Chapter 4: Configuration & Operation

Zlinx 485 Manager software is used to configure Zlinx 485 hardware. Using Zlinx 485 Manager, the system can be configured to operate in Peer-to-Peer or Modbus modes (receiving Modbus commands and data from a Modbus base module). Digital inputs can be configured to operate in Discrete (on/off) or Frequency Counter modes and analog inputs and outputs are configurable for voltage or current loop operation.

Configuring Zlinx 485

Zlinx 485 modules can be configured to operate as Modbus nodes or as serial links in Peer-to-Peer mode.

Configuring Modbus Mode

When the Zlinx 485 receives a Modbus message to write to a discrete output (0xxxx addresses in its memory map), the Zlinx 485 module turns on its corresponding digital output. If a message containing holding register data is received (4xxxx addresses in its memory map), the Zlinx 485 module converts the value to a voltage or current signal on the corresponding analog output.

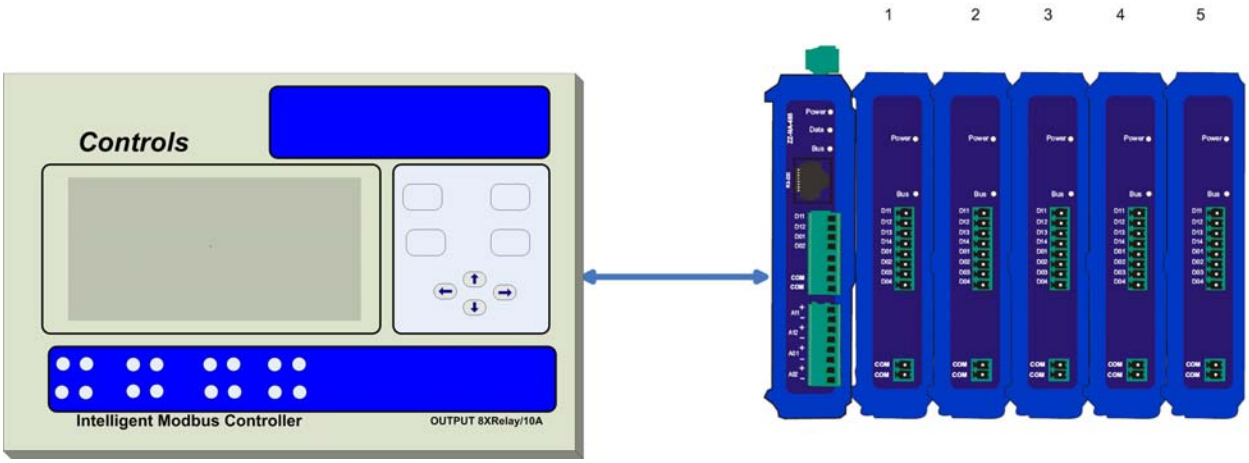


*Figure 29. Modbus Mode devices may be PLCs, RTUs, DCSs, or other **Modbus** devices, with links up to 32 nodes per Modbus network*

Figure 30.

Digital and analog signals applied to the Zlinx 485 Expansion module's input terminals are converted to Modbus messages to be sent back to the base module. Digital inputs are

stored as 1xxxx (coil) addresses; analog inputs are converted to 12 bit binary values and stored in 3xxxx (input register) addresses.

To configure the Zlinx 485 for Modbus mode:

1. Select the **Configuration** tab.

2. Select the **Modbus** option button.

3. In the **Modbus Address** box, type the Modbus address to be used. Modbus address 0 is reserved for master systems that do not support broadcasts.

   The allowable range of Modbus addresses is from 1 to 247. The default Modbus address is 1.

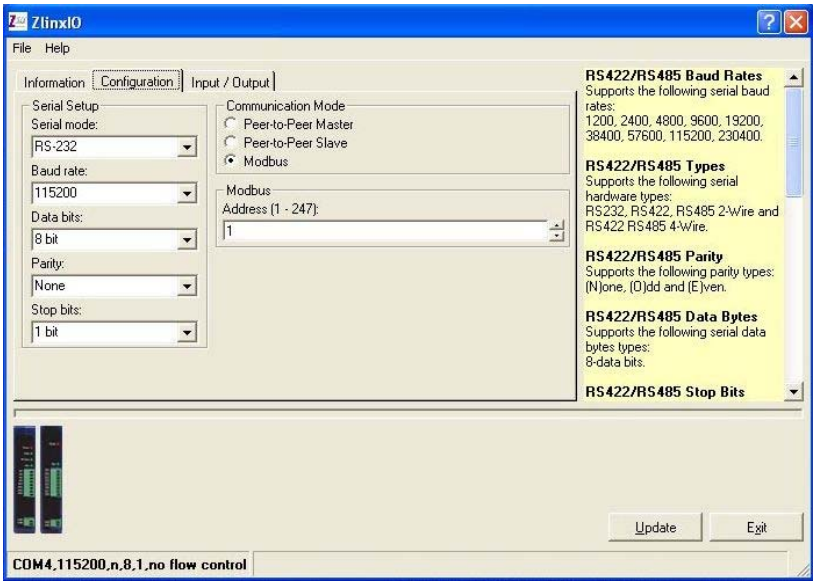


Figure 31. Configuration Tab with Default Values

Testing Modbus Mode Operation

Using a Modbus base module, a PC and Modbus simulation software (e.g. Modscan) you can test the link and hardware, and investigate the operation of the Zlinx 485. Modscan is a Windows application that simulates a Modbus master node. You can read from and write to memory locations on the Zlinx 485. Modscan is available as a fully functional time-limited demo from ***www.win-tech.com***., and more information on the basics of Modbus is available at ***www.bb-elec.com***.

Peer-to-Peer Mode Settings

In Peer-to-Peer mode digital and analog signals can be transferred in both directions across a Zlinx 485 link. For successful communication both base modules must be the same model and all expansion modules must be complimentary (e.g. DI to DO, AI to AO) and arranged in the same order on the Local Bus. One is configured as Peer-to-Peer Master and other is configured as Peer-to-Peer slave. It does not matter which one is configured as master. Additionally, Peer-to-Peer Master address MUST match the Peer-to-Peer Slave address (1-255).

Peer-to-Peer Master

To configure the Zlinx 485 Base module for Peer-to-Peer Master mode:

1. Select the **Configuration** tab.

2. Select the **Peer-to-Peer Master** option button.

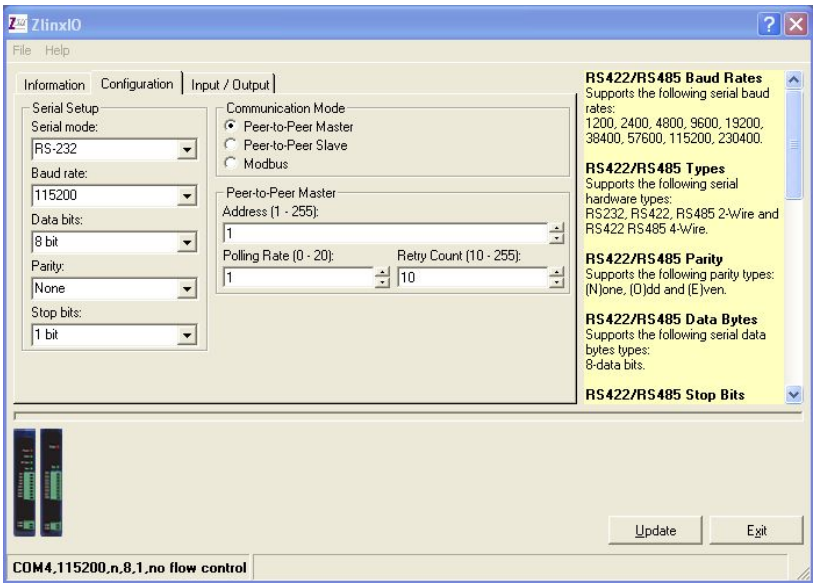


Figure 32. Peer-to-Peer Master Configuration

3. Set the Peer-to-Peer Master address from 1 to 255. Please note the Peer-to-Peer Slave address must also match.

4. The **Polling Rate** box contains the number of seconds between polls by the master. The default value of 1 second is usually satisfactory. The range of values is 0 to 20 seconds. If the I/O points are not updating properly, try increasing the value.

5. The **Retry Count** box contains the number of attempts that will be made to communicate with the slave device before the module indicates communication has

been lost. Lost communication is indicated by the Bus LED's blinking alternately. The default value of 10 is usually satisfactory. The range of values is 10 to 255.

Peer-to-Peer Slave

To configure the Zlinx 485 Base Module for Peer-to-Peer Slave Mode:

1. Select the Configuration tab.

2. Select the Peer-to-Peer Slave option button...

3. Set the Peer-to-Peer Slave address from 1 to 255. Please note the Peer-to-Peer Master address must also match.

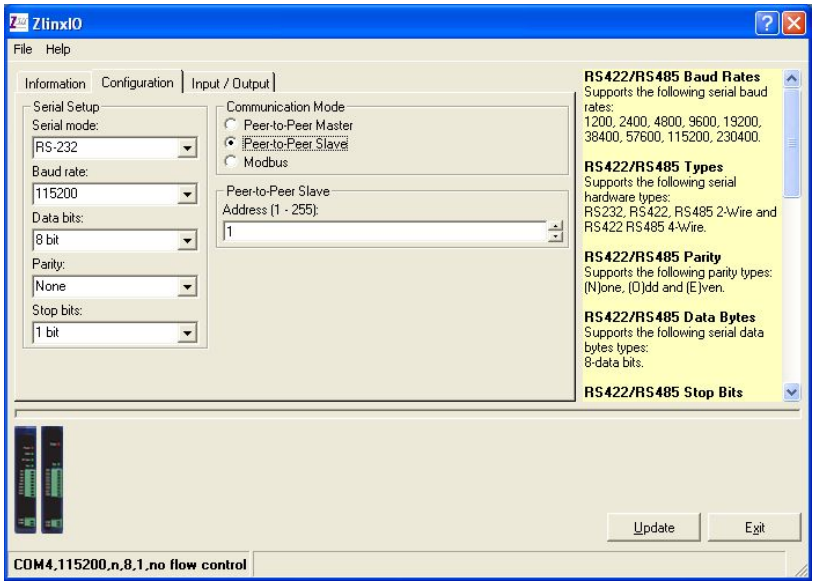


Figure 33. Peer-to-Peer Slave Configuration

Input/Output Settings

Digital inputs and analog inputs/outputs on Zlinx 485 modules are configured from the Input/Output tab of the Zlinx 485 Manager. The first two digital inputs on any module can be configured as Discrete inputs or Frequency Counter inputs. (Any additional digital inputs operate as Discrete inputs only.) Frequency Counter operation is only functional when the Zlinx 485 is set up in Modbus mode. Analog inputs and outputs can be configured for voltage or current loop operation.

To configure digital and analog I/O:

1. Select the Input/Output tab.

An input tree appears listing all base and expansion modules in the system and the inputs available on them.

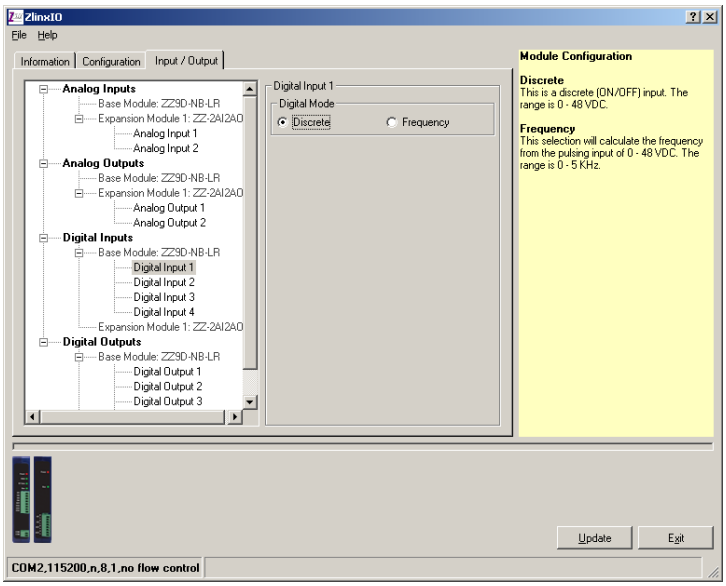


Figure 34. Digital Input Configuration

2. Select the Digital Input to be configured.

3. Select Discrete or Frequency Counter (for the first two inputs only). **Do NOT exceed 5 kHz for frequency input.**

Setting the Digital Mode of either of the first two DI's to Frequency Mode sets both DI's on that module to the same mode. Do NOT exceed 5 kHz for frequency input.

4. Select the Analog Input to be configured.

5. Select the required Analog Mode (0 to 10 VDC or 0 to 20 mA).

Setting the Analog Mode of one AI or AO sets all AI's and AO's on that module to the same mode.

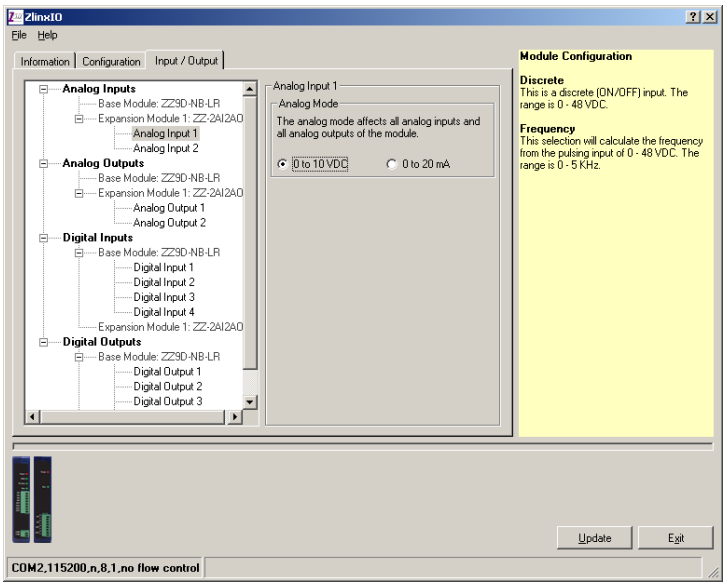
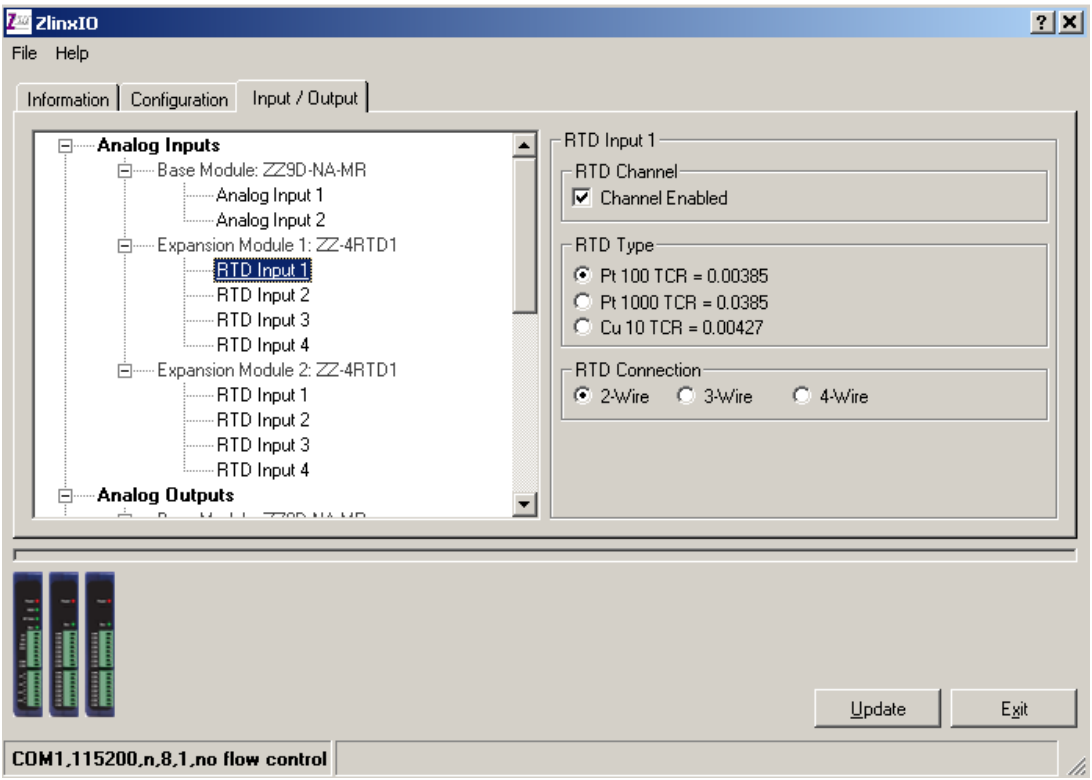


Figure 35. Analog Input Configuration

6. Select the Analog Output to be configured.
7. Select the required Analog Mode (0 to 10 VDC or 0 to 20 mA).

If RTD module present then,

1. Select the Input/Output tab.



An input tree appears listing all base and expansion modules in the system and the inputs available on them.

2. Select the RTD to be configured.

3. To increase speed, RTD channels may be turned on or off. If nothing is connected to the RTD channel, then uncheck the Channel Enabled option.

4. Select the RTD type as PT100, PT1000, CU10 depending on your RTD type.

5. Select if you have wired a 2, 3, or 4 wire RTD probe to the input module.

Setting the Analog Mode of one AI or AO sets all AI's and AO's on that module to the same mode.

Saving the Configuration

When all configuration settings are complete, click the Update button to save them in the Zlinx 485 Base and Expansion modules.

1. The Progress bar at the bottom of the windows shows the progress of the update.

2. The Status bar displays the following text:

```
Sending module parameters to the base module.
```

3. When the updating process is complete, the Status bar displays the message:

```
The configuration has been sent successfully.
```

Updating Zlinx 485 Firmware

From time to time updated firmware may become available for Zlinx 485 modules (from the B&B Electronics website). When the Zlinx 485 Manager software is installed on your computer the Zlinx 485 Updater software is also installed. This can be used to update the firmware in your Zlinx 485 modules. The following procedure describes the firmware updating process

4. Disconnect power from the base module.

5. Disconnect all modules from external equipment. (The easiest way to disconnect is to unplug all terminal blocks.)

6. Connect expansion modules requiring updates to the base module. (The male local bus connector on the first expansion module plugs into the female connector on the base module. The second expansion module plugs into the first, etc.)

7. Connect the PC serial port (COM 1 to 16) to the base module using the supplied RJ45 (male) to serial (DB9 female) cable.

8. From the Windows Start menu, start the Zlinx 485 Firmware Updater software.

9. The Zlinx 485 Firmware Updater Caution dialog box appears:

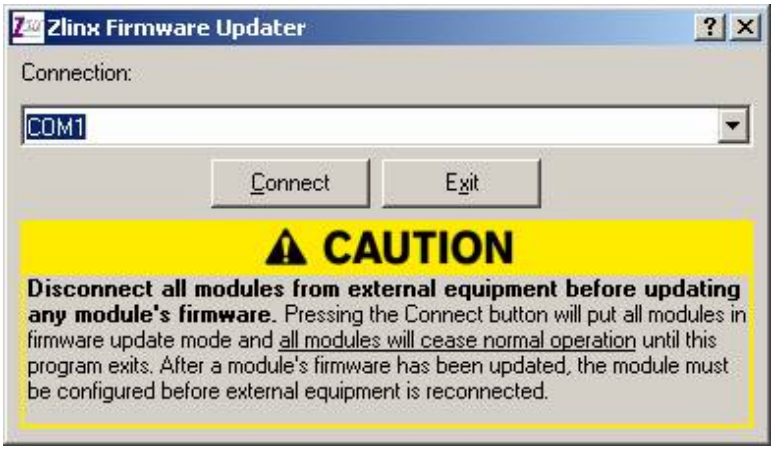


Figure 36. Firmware Updater Caution Dialog Box

10. Select the COM port from the Connection drop down list.

11. Click Connect.

12. Re-apply power to the Zlinx 485 Base module. The Power LED should light up.

13. The Zlinx 485 Firmware Updater window opens and displays a list of the base and expansion modules.

14. On the module list, select the base or expansion module to be updated.

15. In the Firmware Image drop down box, select the image file (.hex).

16. Click the Program button to load the firmware into the module.

17. When all updates are complete, click Exit.

18. Before reconnecting the I/O run the Zlinx 485 Manager software and check to ensure all modules are configured properly.

19. When the configuration check is complete:

    a. Exit the Zlinx 485 Manager program

    b. Disconnect power from the Base Module

    c. Reconnect the I/O.

20. Re-connect power to the Base Module.

Chapter 5: Modbus Help

Modbus ASCII/RTU Basics

The Modbus protocol emerged in the mid-1970s as an early protocol for linking terminals with Modicon PLCs using a master/slave (sometimes called a master/client) relationship. A simple, open, message-based protocol, it caught on quickly and became a defacto standard in the industry. It supports asynchronous point-to-point and multidrop communications and can be used with a variety of serial interfaces (RS-232, RS-422, RS-485, modems, etc).

The original Modbus specification included two possible transmission modes: ASCII and RTU. Modbus RTU mode is the most common implementation, using binary coding and CRC error-checking. Modbus ASCII messages, though somewhat more readable because they use ASCII characters, is less efficient and uses less effective LRC error checking. ASCII mode uses ASCII characters to begin and end messages whereas RTU uses time gaps (3.5 character times) of silence for framing. The two modes are incompatible so a device configured for ASCII mode cannot communicate with one using RTU.

All Modbus communications are initiated by Modbus masters using a polling query/response format. The master can send broadcast messages (using a slave address of 0), which all slaves accept, but do not reply to. More commonly the master polls individual slaves sequentially. In each poll it sends a message containing a **device address**, followed by a **function code**, any **data** that maybe required, and an **error check** field. The addressed slave responds with a similar message structure. Typically it repeats back its address and the function code, and then sends a field indicating the number of bytes of data it is sending, followed by the data and the error check field.

Slave addresses can range from 1 to 247. Function codes include several common ones typically used in all applications, and additional ones that may be implemented in specific cases. Common function codes include: Read Coil Status (01), Read Input Status (02), Read Holding Registers (03) and Read Input Registers (04).

When a master sends a message to a slave it expects to receive a valid response within certain length of time. If the slave does not receive the message, or if the slave receives the message but an error is detected, it does not respond. If the slave cannot respond appropriately for some other reason (e.g. it does not recognize the function code), it will return a message containing an exception response.

Hints and Tips

A few simple suggestions that may assist you if your system is experiencing problems include:

- Slowing down the polling rate may be helpful if power cycling doesn't cure the problem.
- A common misperception is that every serial network must terminate with a resistor. While this was true of early serial network configurations, it's typically the wrong answer – call our technical support and verify if you're an exception, at 815.433.5100 option 3.
- A sometimes difficult problem is difference in grounding voltage between various network locations. Stray voltage from lightning or other sources may also find its way onto the network. These conditions make isolation necessary in many settings.

Appendix A: Product Specifications

Base Module Models:	ZZ-NA-485, ZZ-NB-485, ZZ-NC-485, ZZ-ND-485
Expansion Module Models:	ZZ-4AI, ZZ-4AO, ZZ-2AI2AO, ZZ-8D0-T, ZZ-8D0-T1, ZZ8DDO-R, ZZ-4DI4DO-DCT, ZZ-4DI4DO-DCT1, ZZ4RTD1
Quick Start guide:	Paper copy, PDF available on enclosed CD-ROM disc
Manual:	Available on enclosed CD-ROM disc, and on B&B website
CD-ROM disc:	Zlinx 485 Manager PDF of Zlinx 485 User Manual PDF of Quick Start guide
Operating Systems supported:	Windows ME/98/2000/XP
Dimensions:	1.15 x 3.65 x 5 in (2.92 x 9.27x 12.7 cm)
Expansion Feature:	1 base module and up to 6 expansion modules
Power Indicator:	Red LED
Data Indicator:	Green LED (blinks with TD or RD data traffic, Off = no data traffic)
Bus Indicator:	Green LED (blinks with TD or RD bus traffic, Off = no bus traffic)
Data Error Indicator:	Data & Bus LED's blink alternately
Modbus Connectors:	Removable screw terminal (5 position) block, 3.5 mm spacing
Serial Connectors	
Side connector:	RF-45 female, RS-232
Top connector:	Removable screw terminal block (5) with screw down clamping
Interface Lines Supported:	RS-232 RS-422/485 RDB+, RDA-, TDB+, TDA-
Serial Data Rates:	1200, 2400, 3600, 4800, 9600, 19200, 38400, 57600, 115200, 230400 bps
I/O Connectors:	Removable screw terminal (2, 4 or 8 position) block, 3.5 mm spacing
Digital Inputs	
Voltage Range:	0 to 48 VDC
Low Voltage (0):	0.8 V maximum
High Voltage (1):	4.0 V minimum
Pull up Resistor (NPN Input):	130K
Pull down Resistor (PNP Input)	10K

Frequency Input:	Two DI inputs per module software selectable as Frequency Counters, 0 to 5 kHz range (do NOT exceed more than 5kHz)
Digital Outputs	
Voltage Range:	10 to 45 VDC (for sourcing outputs), 0 toVDC (for sinking outputs)
Open Source:	40 mA per output
Analog Inputs/Outputs	
Ranges:	0 to 10 VDC or 0 to 20 mA
Resolution:	12 bit
Input Accuracy:	0.15 % full scale reading typical, 0.2 % max
Output Accuracy:	0.15 % full scale reading typical, 0.2 % max
AI Load Resistance:	100 Mega ohms when configured for voltage input 250 ohms when configured for current input
AO Max Output Current:	1 mA when configured for voltage output
AO Max Source Load:	375 ohms at 20 mA and 10V input voltage when configured for current output
Input Protection:	Over-voltage to 2x max input voltage
Power Supply Voltage Requirements:	10 VDC to 30 VDC
Power Supply:	Not included
Base Module Power Connector:	Removable screw terminal (2) block, 3.5 mm spacing
Relay Outputs	
Number of Relays:	8
Type:	C (normally open and normally closed)
Output Connection:	3.5mm removable terminal block (2 per output)
Common Connectin:	3.5mm removable terminal block (1 per bank of 4 output)
Ratings:	250 VAC @ 8A, 30 VDC @ 5A (maximum per bank of 4 as grouped on the label)
RTD Inputs	
Number of RTD:	4
Wire configuration:	2, 3, and 4 wire
Type:	PT100*, PT1000*, Cu10** *Optimized for temperature coefficient of 385 **Optimized for temperature coefficient of 427
Input Connection:	3.5mm removable terminal block (4 per output)
Temperature Range:	PT100 = -200 to 650 º C PT1000 = -200 to 100 º C Cu10 = -100 to 260 º C

Resolution:	0.1 ◦ C across -40 to 85 º C
Accuracy @ 25◦C:	±0.5ºC typical
Accuracy -40 to 85◦C:	±2.0ºC maximum
Power Consumption:	ZZ-Nx-485 = 1W ZZ-4AI = 1W ZZ-4AO = 1.1W ZZ-2AI2AO = 1.2W ZZ-8DI-DC = 0.4W ZZ-8DO-T = 15.8W ZZ-8DO-T1 = 1.1W ZZ-8DO-R = 3.2W ZZ-4DI4DO-DCT = 8.1W ZZ-4DI4DO-DCT1 = 1.0W ZZ-4RTD1 = 0.4W
Operating Temperature:	-40 to 80°C (-40 to 176 °F) ZZ-8DO-R -40 to 65ºC (-40 to 149 º F)
Storage Temperature:	-40 to 85 °C (-40 to 185 °F)
Humidity:	10% to 90% R.H. non-condensing
Enclosure Rating:	IP30
Mounting:	DIN rail mount, 35 mm
Certifications:	FCC: Part 15 Class A CISPR (EN55022) Class A EN61000-6-1 Generic Standards for Residential, Commercial & Light Industrial EN61000-4-2 ESD EN61000-4-3 RFI EN61000-4-4 EFT EN61000-4-6 CI
Accessories and Replacement Parts:	ZZ-DIN1 DIN clip and spring for all ZZ products, 4 spare screws for enclosure ZZ-TB1 Removable terminal block for all ZZ modules

Appendix B: Dimensional Diagrams

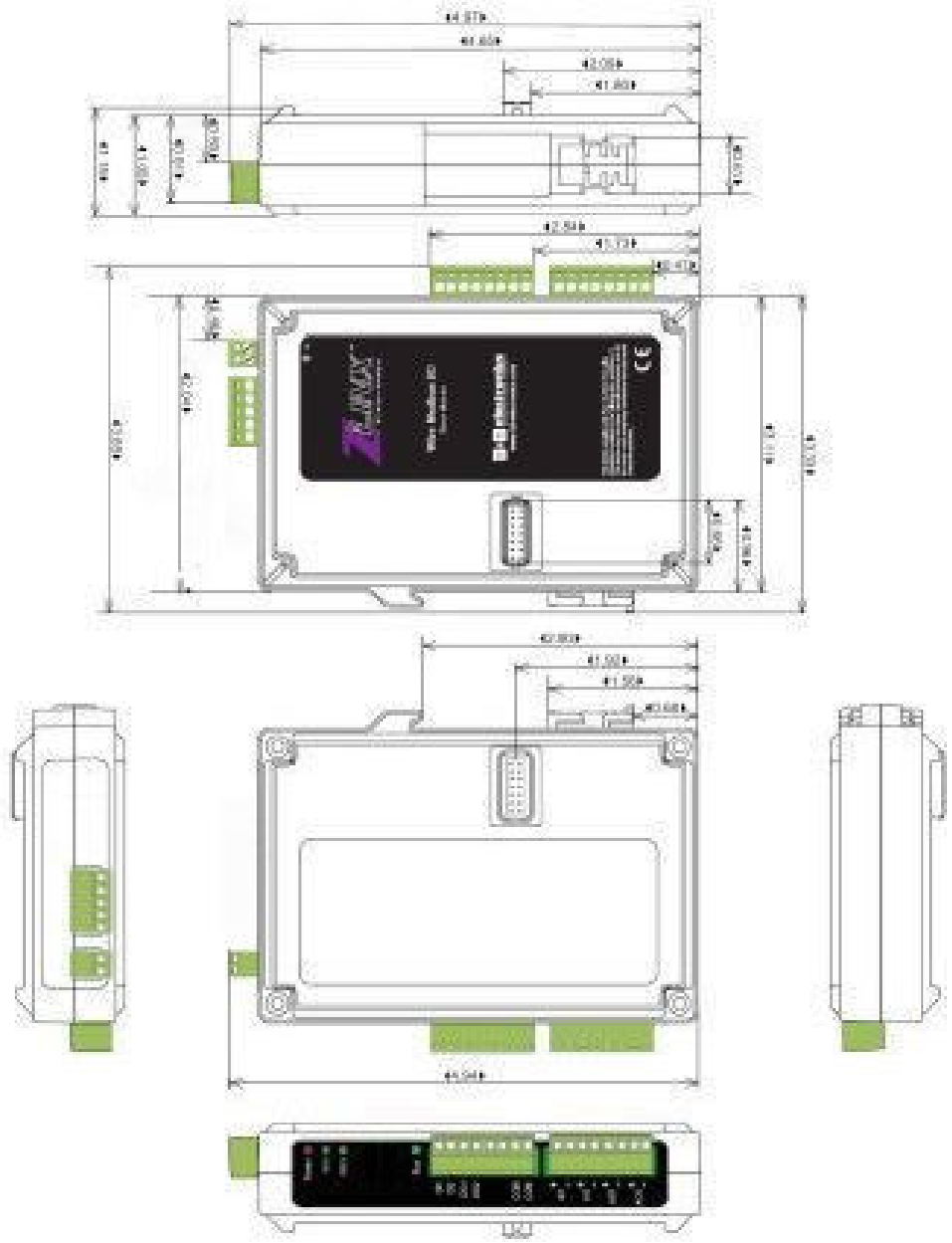
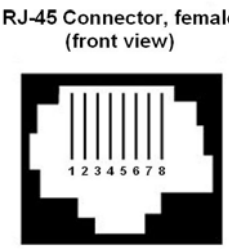


Figure 37. Dimensional Diagram of a Zlinx 485 Base Module

Appendix C: Serial Connections

RS-232 Pinouts

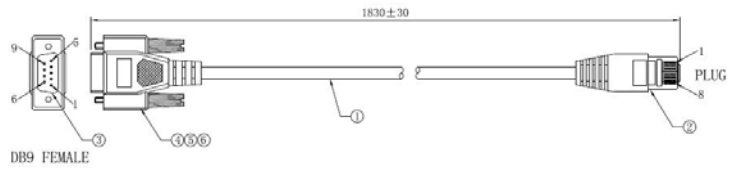


RJ-45F Pin	Signal	RS-232	DCE
1	Signal Ground	GND	---
2	Signal Ground	GND	---
3	Receive Data	RD	IN
4	Transmit Data	TD	OUT
5	Clear to Send	CTS	IN
6	Request to Send	RTS	OUT
7	Not Used	---	---
8	Not used	---	---

Figure 38. RS-232 Connections for RJ45 type plug

Note: PIN 4 (RTS) is reserved for the configuration software only. Asserting RTS during normal operation will result in a communication failure. Disable RTS if your hardware supports it

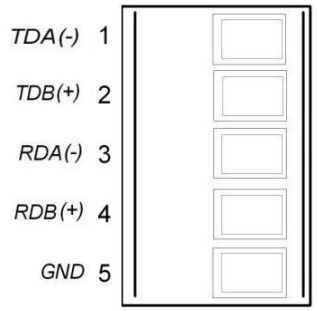
RJ45 Male to RS-232 Female Pinout



RJ45 male	DB9 female	Signal Name	Direction
1	5	Signal Ground	---
2	5	Signal Ground	---
3	3	Receive Data	IN
4	2	Transmit Data	OUT
5	7	Clear to Send	IN
6	8	Request to Send	OUT
7	9	Not Used	---
8	9	Not used	---

Figure 39. RJ45 Male to RS232 female adapter cable

RS-422/485 4 Wire Pinouts

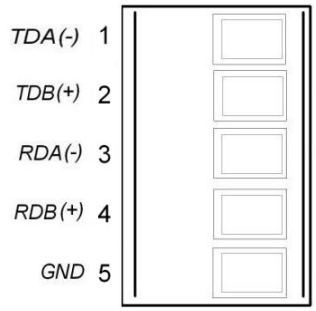


Signal Name	Label	Direction	Terminal
Transmit Data (-)	TDA(-)	Out	1
Transmit Data (+)	TDB(+)	Out	2
Receive Data (-)	RDA(-)	In	3
Receive Data (+)	RDB(+)	In	4
Signal Ground (COM)	COM	---	5

Figure 40. Zlinx Base Module Terminal Block Pin-out for RS-422/485 Four-Wire Operation

Note: 4-Wire Connections must be wired as Mater/Slave. Refer to B&B Electronics RS-485 Application Note.

RS-485 2 Wire Pinouts



Signal Name	Label	Direction	Terminal
DataA (-)	TDA(-)	In/Out	1
DataB (+)	TDB(+)	In/Out	2
Not used	RDA(-)	---	3
Not used	RDB(+)	---	4
Signal Ground (COM)	COM	---	5

Figure 41. Zlinx 485 Base Module Terminal Block Pin-out for RS-485 Two-Wire Operation

Appendix D: Modbus I/O Assignments

00001-00112 Discrete Digital Outputs

Modbus function codes supported are:

Function 1: Read DO Status
Function 2: Read DI's
Function 3: Read AO Status
Function 4: Read AI's
Function 5: Write to Single DO (firmware v2.0 or higher)
Function 6: Write to Single AO
Function 15: Write to Multi DO's

Modbus Address	Description	#Bytes	Count	V Range
00001	Base Digital Output-1	-	0-1	Refer to Appendix A
00002	Base Digital Output-2	-	0-1	Refer to Appendix A
00003	Base Digital Output-3	-	0-1	Refer to Appendix A
00004	Base Digital Output-4	-	0-1	Refer to Appendix A
00005	Base Digital Output-5	-	0-1	Refer to Appendix A
00006	Base Digital Output-6	-	0-1	Refer to Appendix A
00007	Base Digital Output-7	-	0-1	Refer to Appendix A
00008	Base Digital Output-8	-	0-1	Refer to Appendix A
00009	Base Digital Output-9	-	0-1	Refer to Appendix A
00010	Base Digital Output-10	-	0-1	Refer to Appendix A
00011	Base Digital Output-11	-	0-1	Refer to Appendix A
00012	Base Digital Output-12	-	0-1	Refer to Appendix A
00013	Base Digital Output-13	-	0-1	Refer to Appendix A
00014	Base Digital Output-14	-	0-1	Refer to Appendix A
00015	Base Digital Output-15	-	0-1	Refer to Appendix A
00016	Base Digital Output-16	-	0-1	Refer to Appendix A
00017	EXP-1 Digital Output-1	-	0-1	Refer to Appendix A
00018	EXP-1 Digital Output-2	-	0-1	Refer to Appendix A
00019	EXP-1 Digital Output-3	-	0-1	Refer to Appendix A
00020	EXP-1 Digital Output-4	-	0-1	Refer to Appendix A
00021	EXP-1 Digital Output-5	-	0-1	Refer to Appendix A
00022	EXP-1 Digital Output-6	-	0-1	Refer to Appendix A
00023	EXP-1 Digital Output-7	-	0-1	Refer to Appendix A
00024	EXP-1 Digital Output-8	-	0-1	Refer to Appendix A
00025	EXP-1 Digital Output-9	-	0-1	Refer to Appendix A
00026	EXP-1 Digital Output-10	-	0-1	Refer to Appendix A
00027	EXP-1 Digital Output-11	-	0-1	Refer to Appendix A
00028	EXP-1 Digital Output-12	-	0-1	Refer to Appendix A
00029	EXP-1 Digital Output-13	-	0-1	Refer to Appendix A
00030	EXP-1 Digital Output-14	-	0-1	Refer to Appendix A
00031	EXP-1 Digital Output-15	-	0-1	Refer to Appendix A
00032	EXP-1 Digital Output-16	-	0-1	Refer to Appendix A
00033	EXP-2 Digital Output-1	-	0-1	Refer to Appendix A
00034	EXP-2 Digital Output-2	-	0-1	Refer to Appendix A
00035	EXP-2 Digital Output-3	-	0-1	Refer to Appendix A
00036	EXP-2 Digital Output-4	-	0-1	Refer to Appendix A

Modbus Address	Description	#Bytes	Count	V Range
00037	EXP-2 Digital Output-5	-	0-1	Refer to Appendix A
00038	EXP-2 Digital Output-6	-	0-1	Refer to Appendix A
00039	EXP-2 Digital Output-7	-	0-1	Refer to Appendix A
00040	EXP-2 Digital Output-8	-	0-1	Refer to Appendix A
00041	EXP-2 Digital Output-9	-	0-1	Refer to Appendix A
00042	EXP-2 Digital Output-10	-	0-1	Refer to Appendix A
00043	EXP-2 Digital Output-11	-	0-1	Refer to Appendix A
00044	EXP-2 Digital Output-12	-	0-1	Refer to Appendix A
00045	EXP-2 Digital Output-13	-	0-1	Refer to Appendix A
00046	EXP-2 Digital Output-14	-	0-1	Refer to Appendix A
00047	EXP-2 Digital Output-15	-	0-1	Refer to Appendix A
00048	EXP-2 Digital Output-16	-	0-1	Refer to Appendix A
00049	EXP-3 Digital Output-1	-	0-1	Refer to Appendix A
00050	EXP-3 Digital Output-2	-	0-1	Refer to Appendix A
00051	EXP-3 Digital Output-3	-	0-1	Refer to Appendix A
00052	EXP-3 Digital Output-4	-	0-1	Refer to Appendix A
00053	EXP-3 Digital Output-5	-	0-1	Refer to Appendix A
00054	EXP-3 Digital Output-6	-	0-1	Refer to Appendix A
00055	EXP-3 Digital Output-7	-	0-1	Refer to Appendix A
00056	EXP-3 Digital Output-8	-	0-1	Refer to Appendix A
00057	EXP-3 Digital Output-9	-	0-1	Refer to Appendix A
00058	EXP-3 Digital Output-10	-	0-1	Refer to Appendix A
00059	EXP-3 Digital Output-11	-	0-1	Refer to Appendix A
00060	EXP-3 Digital Output-12	-	0-1	Refer to Appendix A
00061	EXP-3 Digital Output-13	-	0-1	Refer to Appendix A
00062	EXP-3 Digital Output-14	-	0-1	Refer to Appendix A
00063	EXP-3 Digital Output-15	-	0-1	Refer to Appendix A
00064	EXP-3 Digital Output-16	-	0-1	Refer to Appendix A
00065	EXP-4 Digital Output-1	-	0-1	Refer to Appendix A
00066	EXP-4 Digital Output-2	-	0-1	Refer to Appendix A
00067	EXP-4 Digital Output-3	-	0-1	Refer to Appendix A
00068	EXP-4 Digital Output-4	-	0-1	Refer to Appendix A
00069	EXP-4 Digital Output-5	-	0-1	Refer to Appendix A
00070	EXP-4 Digital Output-6	-	0-1	Refer to Appendix A
00071	EXP-4 Digital Output-7	-	0-1	Refer to Appendix A
00072	EXP-4 Digital Output-8	-	0-1	Refer to Appendix A
00073	EXP-4 Digital Output-9	-	0-1	Refer to Appendix A
00074	EXP-4 Digital Output-10	-	0-1	Refer to Appendix A
00075	EXP-4 Digital Output-11	-	0-1	Refer to Appendix A
00076	EXP-4 Digital Output-12	-	0-1	Refer to Appendix A
00077	EXP-4 Digital Output-13	-	0-1	Refer to Appendix A
00078	EXP-4 Digital Output-14	-	0-1	Refer to Appendix A
00079	EXP-4 Digital Output-15	-	0-1	Refer to Appendix A
00080	EXP-4 Digital Output-16	-	0-1	Refer to Appendix A
00081	EXP-5 Digital Output-1	-	0-1	Refer to Appendix A
00082	EXP-5 Digital Output-2	-	0-1	Refer to Appendix A
00083	EXP-5 Digital Output-3	-	0-1	Refer to Appendix A
00084	EXP-5 Digital Output-4	-	0-1	Refer to Appendix A
00085	EXP-5 Digital Output-5	-	0-1	Refer to Appendix A

Modbus Address	Description	#Bytes	Count	V Range
00086	EXP-5 Digital Output-6	-	0-1	Refer to Appendix A
00087	EXP-5 Digital Output-7	-	0-1	Refer to Appendix A
00088	EXP-5 Digital Output-8	-	0-1	Refer to Appendix A
00089	EXP-5 Digital Output-9	-	0-1	Refer to Appendix A
00090	EXP-5 Digital Output-10	-	0-1	Refer to Appendix A
00091	EXP-5 Digital Output-11	-	0-1	Refer to Appendix A
00092	EXP-5 Digital Output-12	-	0-1	Refer to Appendix A
00093	EXP-5 Digital Output-13	-	0-1	Refer to Appendix A
00094	EXP-5 Digital Output-14	-	0-1	Refer to Appendix A
00095	EXP-5 Digital Output-15	-	0-1	Refer to Appendix A
00096	EXP-5 Digital Output-16	1	0-1	Refer to Appendix A
00097	EXP-6 Digital Output-1	-	0-1	Refer to Appendix A
00098	EXP-6 Digital Output-2	-	0-1	Refer to Appendix A
00099	EXP-6 Digital Output-3	-	0-1	Refer to Appendix A
00100	EXP-6 Digital Output-4	-	0-1	Refer to Appendix A
00101	EXP-6 Digital Output-5	-	0-1	Refer to Appendix A
00102	EXP-6 Digital Output-6	-	0-1	Refer to Appendix A
00103	EXP-6 Digital Output-7	-	0-1	Refer to Appendix A
00104	EXP-6 Digital Output-8	-	0-1	Refer to Appendix A
00105	EXP-6 Digital Output-9	-	0-1	Refer to Appendix A
00106	EXP-6 Digital Output-10	-	0-1	Refer to Appendix A
00107	EXP-6 Digital Output-11	-	0-1	Refer to Appendix A
00108	EXP-6 Digital Output-12	-	0-1	Refer to Appendix A
00109	EXP-6 Digital Output-13	-	0-1	Refer to Appendix A
00110	EXP-6 Digital Output-14	-	0-1	Refer to Appendix A
00111	EXP-6 Digital Output-15	-	0-1	Refer to Appendix A
00112	EXP-6 Digital Output-16	-	0-1	Refer to Appendix A

Appendix E: Zlinx 485 Models and Features

Zlinx 485 Base Modules

Model Number	Module Type	Protocols	I/O
ZZNA-485	Base	Modbus, Digital I/O, Analog I/O	RS-422/485, RS-232, 2DI, 2DO, 2AI, 2AO sourcing DO's
ZZ-NB-485	Base	Modbus, Digital I/O, Analog I/O	RS-422/485, RS-232, 4DI, 4DO sourcing DO's
ZZ-NC-485	Base	Modbus, Digital I/O, Analog I/O	RS-422/485, RS-232, 2DI, 2DO, 2AI, 2AO sinking DO's
ZZ-ND-485	Base	Modbus, Digital I/O, Analog I/O	RS-422/485, RS-232, 4DI, 4DO sinking DO's

Expansion Modules

Model Number	Type	I/O	I/O Types
ZZ-4AI	Analog Input Module	4AI	mA, V
ZZ-4AO	Analog Output Module	4AO	mA, V
ZZ-2AI2AO	Analog Input/Output Module	2AI, 2AO	mA, V
ZZ-8DI-DC	Digital Input Module	8DI	Pull-up, R
ZZ-8DO-T	Digital Output Module	8DO	sourcing
ZZ-8DO-T1	Digital Output Module	8DO	sinking
ZZ-4DI4DO-DCT	Digital Input/Output Module	4DI, 4DO	sourcing
ZZ-4DI4DO-DCT1	Digital Input/Output Module	4DI, 4DO	sinking
ZZ-8DO-R	Digital Output Module	8DO	relays
ZZ-4RTD1	Analog Input Module	4AI	RTD

Accessories

Model Number	Description
ZZ-TB1	Removable terminal block replacement kit
ZZ-DIN1	DIN rail mounting kit

Appendix F: Zlinx 485 Troubleshooting

Problem	Causes
Data LED and Bus LED intermittently blink	• Firmware does not match The firmware for all base modules must match and the firmware for all expansion modules must match. The firmware rev number may be viewed on the information tab of the configuration software. If the firmware does not match, then update the firmware with the Firmware Updater Program.
	• No Peer-Peer communication link The serial connection is not established. Verify that all parameters in the configuration tab in the programming software are correct.
	• Too many expansion modules installed Only 6 expansion modules may be connected to any base module.
	• Expansion modules in peer-peer mode do not match In peer-peer mode, the master and slave must have the same number of expansion modules.
	• Expansion module added/removed without cycling power on base module The Zlinx 485 configures the base module and expansion modules on a cycle of power. No damage occurs by adding/removing a module "hot." Power will need to be cycled for the base module to update the expansion locations.

Appendix G: Terms and Definitions

Term	Definition
Base module	Master node with I/O
Expansion module	Expansion node that responds to master node
Local bus header/plug	B&B proprietary RS-485 bus interconnection via 14 pin 2 mm connector